

CLAIMS

1. A sample depositing system comprising:
an illumination source that forms an illumination beam;
a sample transfer device that receives the illumination beam from the
5 illumination source;
a sample material carried by the sample transfer device; and
a controller that causes the illumination source to illuminate the sample
transfer device and thereby cause at least a portion of the sample material carried by
the sample transfer device to be controllably separated from the transfer device and
10 deposited on a work surface, the portion of sample material being deposited without
requiring a portion of the sample transfer device positioned adjacent the sample
material to separate from the sample transfer device.
2. The system of claim 1, wherein the sample transfer device includes:
15 at least one layer of a material that is translucent or transparent to the
illumination beam; and
at least one layer of a material that is opaque to or substantially impedes
transmission of the illumination beam.
3. The system of claim 1, wherein the sample transfer device includes:
20 at least one layer of a transparent material that is transparent to the
illumination beam; and
at least one layer of an opaque material that is opaque to the illumination
beam.
4. The system of claim 3, wherein the layer of transparent material and
25 the layer of opaque material are positioned adjacent to each other and the adjacent
layers move in response to illumination from the illumination beam.
5. The system of claim 3, wherein the at least one layer of opaque
30 material is separated from the sample material by a plastic material.

6. The system of claim 3, wherein the opaque material includes one of a plastic, a metal, a ceramic, a liquid material and a gel.

5 7. The system of claim 3, wherein the at least one layer of opaque material is surrounded by a plastic material.

8. The system of claim 1, wherein the sample material includes a liquid material.

10 9. The system of claim 1, wherein the sample material is carried by the sample transfer device on a side of the sample transfer device opposite the illumination source.

15 10. The system of claim 1, wherein the sample transfer device includes a metal layer surrounded by a clear plastic material.

11. The system of claim 1, wherein the portion of sample material is separated from the sample transfer device in droplet form.

20 12. The system of claim 1, wherein the illumination source includes a laser.

13. The system of claim 1, wherein the portion of the sample material is separated from the sample transfer device by movement of at least a portion of the sample transfer device in response to being illuminated by the illumination beam.

25 14. The system of claim 1, wherein at least a portion of the sample material is separated from the sample transfer device by energy transfer from the illumination beam to the sample material.

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15. The system of claim 1, wherein at least a portion of the sample material is separated from the sample transfer device by heating of a portion of the sample material by the illumination beam.

5 16. The system of claim 1, wherein the sample transfer device includes a chamber that communicates with an opening, and at least a portion of the sample material is located in the chamber.

10 17. The system of claim 1, wherein the sample transfer device includes at least one of a projection and a cavity constructed and arranged to aid in formation of a droplet of sample material.

15 18. The system of claim 1, further comprising a mask having at least one opening, the at least one opening defining a location in which sample material is deposited on a work surface.

20 19. The system of claim 1, wherein the sample transfer device includes a substance that explodes or expands rapidly upon illumination by the illumination beam, explosion or expansion of the substance causing at least a portion of the sample material to be deposited on a work surface.

25 20. The system of claim 1, wherein the portion of sample material being deposited moves in a direction generally against a force of earth's gravity and away from the sample transfer device.

21. A method for depositing a sample material, comprising:
providing a sample material on a sample transfer device;
illuminating the sample transfer device with an illumination beam;
causing at least a portion of the sample material to be separated from the
30 sample transfer device and deposited on a work surface in response to illumination of the illumination beam, the portion of the sample material being deposited without

requiring a portion of the surface positioned adjacent the sample material to separate from the sample transfer device.

22. The method of claim 21, wherein the step of causing includes moving
5 at least a portion of the surface in response to illumination of the illumination beam.

23. The method of claim 21, wherein the step of causing includes transferring energy from the illumination beam to the sample material.

10 24. The method of claim 21, wherein the step of causing includes heating a portion of the sample material by the illumination beam.

25. The method of claim 21, wherein the step of providing a sample material on a surface includes providing the sample material in a chamber that
15 communicates with an opening, and the step of causing includes causing a portion of the chamber to move in response to illumination by the illumination beam and expelling a portion of the sample material through the opening.

26. The method of claim 21, further comprising providing a mask having
20 at least one opening, the at least one opening defining a location in which sample material is deposited on a work surface, and the step of causing includes expelling a portion of the sample material in a direction toward the mask.

27. The method of claim 21, wherein the step of providing a sample
25 material includes providing a sample transfer device having at least one layer of a material that is optically translucent or transparent to the illumination beam, and at least one layer of a material that is opaque to or substantially impedes transmission of the illumination beam.

30 28. The method of claim 27, wherein the step of providing a sample material includes providing a sample transfer device having at least one layer of a

transparent material that is transparent to the illumination beam, and at least one layer of an opaque material that is opaque to the illumination beam.

29. The method of claim 28, wherein the step of causing includes moving
5 the adjacent layers in response to illumination from the illumination beam.

30. The method of claim 28, wherein the step of providing a sample material includes providing a liquid sample material on a surface of the sample transfer device.

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